

REMARKS

Reconsideration of the above-identified patent application in view of the remarks following is respectfully requested. Claims 1-40 are pending in the application. Claims 1-9 have been rejected on new grounds, claims 10-27 have been objected to and claims 28-40 have been allowed. Applicant gratefully acknowledges the allowance of claims 28-40 and the conditional allowance of claims 10-27. The Examiner's rejection of claims 1-9 is respectfully traversed. However, in order to overcome the rejections and expedite allowance, Applicant has chosen to amend claims 1 and 2 and cancel claims 8 and 9. Claim 1 is amended to incorporate the limitations of claim 8, i.e. "using IEEE 802.3 Ethernet standard packets in both uplink and downlink PON transmissions", as well as one of the limitations of claim 2, i.e. "measuring round trip delay from the central controller to the first node". With the cancellation of claims 8 and 9, the rejection of these claims becomes moot.

The Examiner has requested replacement of hand-drawn Figures 1, 3 and 6 with formal drawings. Replacement sheets are attached.

The present invention is of a protocol for communicating data on a passive optical network (PON) conforming to the Ethernet standard. It provides processes for remote network node discovery and synchronization. Uplink packet transmissions to a central controller, such as an optical line terminal (OLT), are scheduled by the central controller. Downlink packets from the central controller to a remote network node, such as an optical network unit (ONU), are encrypted to preserve privacy, and the key used for encryption is changed periodically. The protocol further provides processes for detecting the loss of physical or logical connection between the central controller and the remote network nodes.

Ethernet is a Carrier Sense Multiple Access/Collision Detect (CSMA/CD) scheme. A device may transmit when the transmission medium is not used by another device. Prior to the present invention, no PONs used Ethernet schemes. In fact, Ethernet PON (EPON) was first introduced in the present invention. Prior art Asynchronous PONs (APON) used a totally different scheme, based on the Time Division Multiplexed Access (TDMA) protocol.

The APON scheme is a very rigid TDMA scheme. In fact, TDMA schemes use cyclical allocation of time slots or "framing". A frame is divided into slots, and each ONU may transmit data in a slot. In contrast, The Ethernet PON disclosed herein is very different and very inventive in the sense that there is no-framing to the TDMA, i.e. no rigid cycle allocation. Each ONU may transmit in a given time slot, unrelated to frame structure. The slots have no fixed length. An APON does not have the no-framing TDMA capabilities of an EPON as disclosed by the present invention.

§ 102 Rejections

Claims 1 and 2 have been rejected under 35 U.S.C. 102(e) as being anticipated by Boyd et al. (US 6801547), hereinafter referred to as Boyd. The Examiner's rejection is respectfully traversed. Applicant has chosen to amend claims 1 and 2 by incorporating in them the limitation "using IEEE 802.3 Ethernet standard packets" for both the uplink and downlink transmissions. The rejection of original claims 1 and 2 is now moot.

Boyd discloses an APON, not an EPON. The word "Ethernet" does not appear anywhere in his specification. In view of the amendment and the remarks above on the difference between EPON and APON, Applicant submits that amended claims 1 and 2 are not anticipated by Boyd, who does not disclose an Ethernet based PON but an APON. Further, in view of the essential differences between EPON and Boyd's PON, amended claims 1 and 2 are not even rendered obvious by Boyd.

§ 103 Rejections

Claims 3-5 and 8-9 were rejected under 35 U.S.C. 103(a) as being unpatentable over Boyd in view of Matsumoto et al (US 6711264), hereinafter referred to as Matsumoto. Claims 6 and 7 were rejected under 35 U.S.C. 103(a) as being unpatentable over Boyd in view of Matsumoto and further in view of Bedrosian (US 6895189). The Examiner's rejection is respectfully traversed. The rejection of claims 8 and 9 becomes moot with their cancellation.

Matsumoto discloses a security system that prevents a commonly shared encryption key from being deciphered by an unwelcome party, while providing easier administration of encryption keys. The security system is applied in communication system where communication devices are configured to conduct simultaneous two-way communication via a single network, in particular for chat sessions. Matsumoto's invention does not deal with PON, and most certainly does not deal with EPON.

As stated in the MPEP, page 2100-128:

To establish a prima facie case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference...must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure. In re Vaeck, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

And on page 2100-131:

The mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination. In re Mills, 916 F.2d 680, 16 USPQ2d 1430 (Fed. Cir. 1990).

Applicant submits with reference to the rejection of claims 3-5 that the combination of Boyd and Matsumoto does not fulfill any of the conditions above.

With respect to claim 3, one of ordinary skill in the art if passive optical networks would have had no reason to look at the art of chat communications to seek encryption devices and techniques. One skilled in the art would have had no reason to believe that applying Matsumoto's encryptor to an APON as in Boyd would work. *Mutatis mutandis*, one skilled in the art would have no reason to believe that the suggested combination would work in an EPON system using TDMA, since EPON was invented herein and was totally unknown prior to this invention. Applicant further submits that the teaching or suggestion to make the claimed combination and the

reasonable expectation of success are not found in the prior art of PON systems. Therefore, the combination of Boyd and Matsumoto does not render claim 3 obvious.

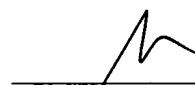
With respect to claims 4 and 5, they include the limitations of claim 3 and therefore are similarly not rendered obvious by the combination of Boyd and Matsumoto.

Objections

Claims 10-27 were objected to as being dependent upon a rejected base claim, but allowable if rewritten in independent form including all of the limitations of the base claims and any intervening claims. The base claim of claim 10 is claim 1, with claim 2 being the intervening claim. Since Applicant has amended claims 1 and 2 to include the inventive limitation of "using IEEE 802.3 Ethernet standard packets" for both the uplink and downlink transmissions, the limitation is now included in claims 10-27, and Applicant submits that they need not be rewritten in independent form.

In view of the above amendments and remarks it is respectfully submitted that claims 1-7 and 10-27 are now in condition for allowance in addition to allowed claims 28-40. Prompt notice of allowance is respectfully and earnestly solicited.

Respectfully submitted,



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